

18.

A Quantitative Study of the Testes of Certain Mammals.

THOMAS H. KNEPP.

(Text-figures 1 & 2).

A quantitative histological study of the testes of six mammals, four domestic and two wild, was undertaken in 1935, and the research problem initiated at that time has been continued through the cooperation of the Laboratory and Hospital of the New York Zoological Park in supplying me with testes of mammals which died in the Zoological Park.

The testes were fixed in 10% formalin, except those of the gray squirrel and cottontail rabbit which were fixed in Bouin's picro-formol. Each testis was weighed after fixation and hardening. Material was sectioned in paraffin, then stained with Heidenhain's iron-hematoxylin.

Microscopic measurements were made with an ocular micrometer. In finding the percentage of interstitial tissue and seminiferous tubules the paper method employed by Bascom (1925) was used. This method does not take into account the thickness of the tunica albuginea and mediastium in calculating the amount of seminiferous tubules and interstitial tissue.

The average of 20 measurements was used in computing the diameter of the seminiferous tubules and the thickness of the tunica albuginea. In finding the average size of the sperms 25 measurements were taken.

Testes from the polar bear, Punjab wild sheep, mouflon and wallaroo were from the Zoological Park; testes from the Virginia deer, gray squirrel and cottontail rabbit were from the fauna of Pennsylvania.

In the table below, the date the specimen was secured is given. It remains to be proved whether the season of the year has anything to do with spermatogenesis and quantitative measurements.

It is evident that the testicular weight bears no ratio to the gross weight of the animal. Tubular diameter is not as great in the carnivore (polar bear) as in the six herbivores; likewise the cross-section area of the tubules is smaller in the carnivore. The polar bear and gray squirrel are at the extremes in thickness of tunica albuginea and connective tissue. The smallest testis in weight has the thinnest tunica albuginea and connective tissue, but the greatest thickness is not found in the heaviest testis.

The percentage of interstitial tissue is greatest in the polar bear, but relatively constant in the herbivores; the inverse is true of the seminiferous tubules. The length of the seminiferous tubules is greater in the largest testes, the weight of the testis being due to the increased length of the tubules.

In meters of tubules per gram of testicular weight, and in meters of tubules per gram of tubules, the carnivore is the extreme. Sperm sizes vary from the smallest in the Virginia deer to the largest in the wallaroo, the intermediate ones being fairly constant. The heads of the sperms of all the animals except the wallaroo are somewhat oval; those of the wallaroo appear

to be pointed and thin, with the end of the head somewhat curved. In the wallaroo no loose sperms are seen in the lumen of the tubules; the tails are in large masses, making the individual study of a sperm difficult. This may be due to the fact that the animal was immature.

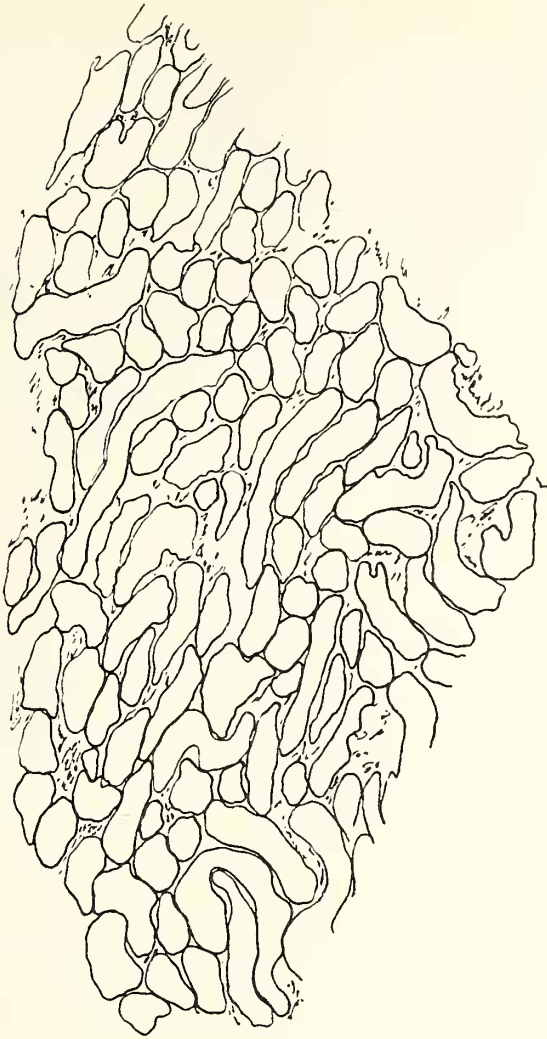
	Polar Bear	Punjab Wild Sheep	Mouflon	Virginia Deer	Wallaroo	Gray Squirrel	Cottontail Rabbit
Date secured	11/2/37	1/6/38	1/6/38	12/4/37	2/17/38	11/25/33	5/22/35
Weight of the testis without epididymus, grams	31.7	70.2	41.05	36.2	5.8	1.97	9.6
Mean tubule diameter, microns	105.8	176.4	149.5	139.4	141.1	169.68	173.88
Mean cross-section area of tubules, square millimeters	0.008	0.024	0.017	0.014	0.015	0.022	0.023
Mean thickness of tunica albuginea and connective tissue, microns	708.3	555.2	473.7	168.0	164.6	99.9	374.64
Interstitial tissue, percent.	33.5	15.86	15.45	17.94	21.96	18.44	18.69
Seminiferous tubules, percent.	66.5	84.14	84.55	83.06	78.04	81.55	81.30
Length of seminiferous tubules, meters	2635	2461	2041	2121	301	73	339
Meters of tubules per gram of testicular weight	83.1	31.5	49.7	58.5	52.0	37.1	35.3
Meters of tubules per gram of tubules	125.5	41.7	58.8	71.4	67.1	45.6	43.5
Length of average sperm, microns	36.3	24.3	26.6	18.9	49.4	27.47	29.57

Text-figures 1 & 2 (gray squirrel and cottontail rabbit) illustrate the structural make-up of the respective testes. Definite pyramidal arrangement is evident in the rabbit testis, the base of the pyramid resting on the tunica albuginea, the apex pointing toward the center. (This arrangement is also evident in the common dog).

From the Zoological Park's Laboratory and Hospital there have been sent to me testes from the collared peccary, mouflon, white-tailed paradoxure, Hussar monkey, woolly monkey, tahr, pigmy hippopotamus, Kadiak bear, axis deer, black buck antelope and North and South African ostrich. Since this group includes carnivores, herbivores and omnivores, the data when prepared may show some interesting facts.

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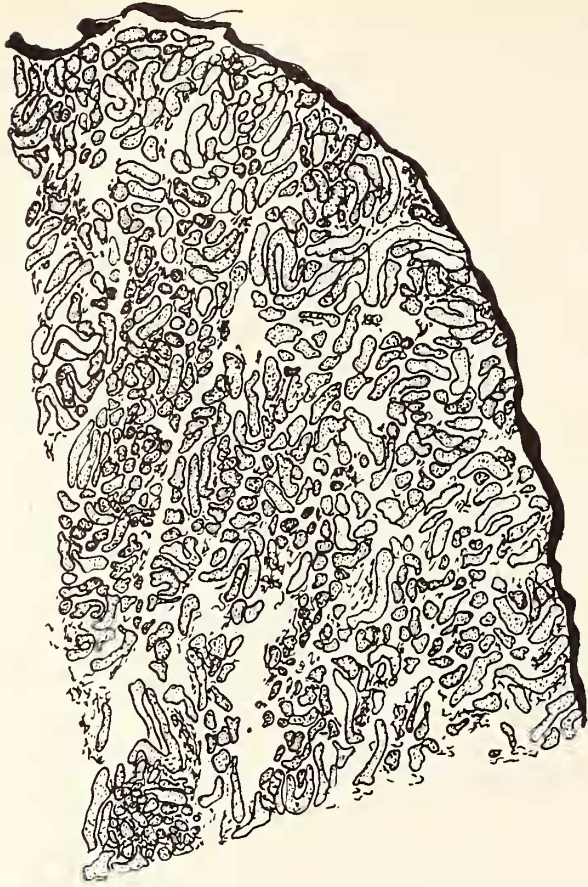
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Text-figure 1.

Section of Gray Squirrel testis. Tubules not in any definite arrangement.

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Text-figure 2.

Section of Cottontail Rabbit testis. Tubules in pyramidal arrangement, with bases of pyramids resting on tunica albuginea.